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Waterford-3

W3F1-2004-0091

October 27, 2004

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Response to NRC Generic Letter 2004-01, Requirements for Steam
Generator Tube Inspections
Waterford Steam Electric Station, Unit 3
Docket No. 50-382
License No. NPF-38

REFERENCES: 1 NRC letter dated August 30, 2004, *Generic Letter 2004-01, Requirements for Steam Generator Tube Inspections*
2 Entergy letter dated November 18, 2003, *Combined Category C-3 and 15-Day Special Report SR-03-002-00 on the 12th Refueling Outage Steam Generator Tube Inservice Inspection (W3F1-2003-0089)*

Dear Sir or Madam:

Per Reference 1, the NRC issued Generic Letter 2004-01 regarding steam generator tube inspections. The NRC requested that all Pressurized Water Reactors (PWRs) who have not ceased operation provide information within 60 days of the date of the generic letter regarding past and proposed practices on inspection of steam generator tubes using the most appropriate 10CFR50, Appendix B inspection methods. The response to the requested information for Waterford-3 is provided in Attachment 1 to this letter.

Attachment 2 provides commitments being made as a result of our response to this generic letter. If you have any questions or require additional information, please contact Ron Williams at 504-739-6255.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 27, 2004.

Sincerely,

A handwritten signature in black ink, appearing to read "R A Dodds" followed by a stylized flourish.

RAD/SAB/RLW/cbh

Attachments:

1. Response to Generic Letter 2004-01 for Waterford-3
2. List of Regulatory Commitments

ALLS

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U.S. Nuclear Regulatory Commission
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Attachment 1

W3F1-2004-0091

Response to Generic Letter 2004-01 for Waterford-3

Response to Generic Letter 2004-01 for Waterford-3

NRC Generic Letter 2004-01 *Requirements for Steam Generator Tube Inspections*, dated August 30, 2004 was sent to all holders of operating licenses for pressurized-water reactors (PWRs), except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

The generic letter requested the following information within 60 days:

NRC Requested Information 1

Addressees should provide a description of the SG tube inspections performed at their plant during the last inspection. In addition, if they are not using SG tube inspection methods whose capabilities are consistent with the NRC's position, addressees should provide an assessment of how the tube inspections performed at their plant meet the inspection requirements of the TS in conjunction with Criteria IX and XI of 10 CFR Part 50, Appendix B, and corrective action taken in accordance with Appendix B, Criterion XVI. This assessment should also address whether the tube inspection practices are capable of detecting flaws of any type that may potentially be present along the length of the tube required to be inspected and that may exceed the applicable tube repair criteria.

Waterford-3 Response:

Waterford-3 has two Combustion Engineering Model 3410 steam generators. The tubing material in each steam generator is high temperature mill annealed (HTMA) Alloy 600. The tubes are expanded through the full depth of the tube sheet using an explosive process. Tube rows 1 through 18 are U-bends and rows 19 through 147 are square bends.

A detailed description of the inspections, including the inspection results, is provided in Waterford-3's letter dated November 18, 2003 (Ref 2). The following table provides a summary of the type of probe used for the inspection and the inspection scope performed at Waterford-3 during the last inspection in the fall of 2003 (RF12).

Location	Probe	Scope	Extent
Egg-crates & Batwings	Bobbin	100% FL	Full Length
	Plus Point	All identified bobbin I-codes	Support +/- 1 inch
Free Span, Sludge Pile, Non-Dented-Supports	Bobbin	100%	Full Length
Dents/Dings \leq 2 and 5 volts	Bobbin	20%	+/- 1 inch on either side of dent/ding

Location	Probe	Scope	Extent
Tube Sheet Crevice Non-expanded Tubes	Plus Point	100 %	Full Depth of tubesheet
Free Span, Sludge Pile, Supports,	Plus Point	All Bobbin I-codes	N/A
Expansion Transition	Plus Point	100% TTS HL	+3 to -8
Low Row U-Bend	Plus Point	100% Rows 1-2 20% Rows 3-10	Support to Support

The Waterford-3 SG tube inspection scope is not consistent with the NRC's position with respect to inspections performed within the tube sheet. Waterford-3 has utilized the Combustion Engineering Owners Group (CEOG) Task 1154 which was developed to evaluate pull-out distance and leakage. Based on this analysis, the inspection scope was limited due to the fact that the tube could not burst and leakage was within safety analysis limits. Additional leakage was accounted for in the safety assessment for the un-inspected portion of the tube sheet. The other areas of the SG inspections are consistent with the NRC's position.

Entergy concludes that there is a potential for degradation to exist below the depth of tube inspections within the tubesheet region performed during RF12. This conclusion is based on recent inspection results from steam generators of similar designs. The appropriate tube inspection depth is being revised based on a joint Industry testing program provided in WCAP-16208-P, Revision 0 (*NDE Inspection Length for CE Steam Generator Tubesheet Region Explosive Expansions*, October 2004) that demonstrates that flaws below a defined inspection distance within the tubesheet are not a safety concern.

Requested Information 2

If addressees conclude that full compliance with the TS in conjunction with Criteria IX, XI and XVI of 10 CFR Part 50, Appendix B, requires corrective actions, they should discuss their proposed corrective actions (e.g., changing inspection practices consistent with the NRC's position or submitting a TS amendment request with the associated safety basis for limiting the inspections) to achieve full compliance. If addressees choose to change their TS, the staff has included in the Attachment suggested changes to the TS definitions for a tube inspection and for plugging limits to show what may be acceptable to the staff in cases where the tubes are expanded for the full depth of the tubesheet and where the extent of the inspection in the tubesheet region is limited.

Waterford-3 Response:

Entergy is not consistent with the NRC's position with regard to the inspection scope by not performing inspections to the full depth of the tubesheet using the Plus Point probe where degradation could be expected to be present. Waterford-3 will increase the depth of inspections

in the next RF13 refueling outage (spring 2005) to the analyzed safety assessment depth consistent with WCAP-16208-P, Rev. 0. The condition for limiting the Plus Point depth of SG tube inspection during the last refueling outage inspection has been entered into Waterford-3's corrective action program.

Entergy will submit a technical specification change consistent with the EPRI Generic Licensing Change Package (GLCP) as provided by Technical Specification Task Force (TSTF)-449, Revision 2, *Steam Generator Tube Integrity*. Entergy will submit this change as part of the NRC Consolidated Line Item Improvement Process (CLIIP) or as a Waterford-3 specific amendment request by February 15, 2005 if the CLIIP has not been released by the NRC. The specific limitation for tubesheet inspection depth using the Plus Point probe will be included with the proposed technical specification change. As discussed in the generic letter, the current limitation for use of the Plus Point probe in the subject region of the tubesheet does not constitute a non-compliance with the Waterford-3 technical specifications. Therefore, NRC approval of the proposed TSs does not need to occur prior to the resumption of power from the spring 2005 refueling outage SG tube inservice inspection.

Requested Information 3

For plants where SG tube inspections have not been or are not being performed consistent with the NRC's position on the requirements in the TS in conjunction with Criteria IX, XI, and XVI of 10 CFR Part 50, Appendix B, the licensee should submit a safety assessment (i.e., a justification for continued operation based on maintaining tube structural and leakage integrity) that addresses any differences between the licensee's inspection practices and those called for by the NRC's position. Safety assessments should be submitted for all areas of the tube required to be inspected by the TS, where flaws have the potential to exist and inspection techniques capable of detecting these flaws are not being used, and should include the basis for not employing such inspection techniques. The assessment should include an evaluation of (1) whether the inspection practices rely on an acceptance standard (e.g., cracks located at least a minimum distance of x below the top of the tube sheet, even if these cracks cause complete severance of the tube) which is different from the TS acceptance standards (i.e., the tube plugging limits or repair criteria), and (2) whether the safety assessment constitutes a change to the "method of evaluation" (as defined in 10 CFR 50.59) for establishing the structural and leakage integrity of the joint. If the safety assessment constitutes a change to the method of evaluation under 10 CFR 50.59, the licensee should determine whether a license amendment is necessary pursuant to that regulation.

Waterford-3 Response:

The RF12 outage Plus Point probe inspections were limited to eight inches below the top of tubesheet. Entergy has concluded that there is a potential for degradation to exist below the depth of tube inspections within the tubesheet region. A safety assessment that addresses the Waterford-3's RF12 inspection of the subject region is provided below. The results demonstrate that SG operability is maintained because there is no tube burst concern and that assumed leakage does not exceed the accident analysis assumed value of 0.5 gpm per SG.

The safety assessment does not constitute a change to the "method of evaluation" (as defined in 10 CFR 50.59) for establishing the structural and leakage integrity of the joint.

Safety Assessment

Waterford-3 inspected from +3" to -8" from the top of tubesheet (TTS) within the tubesheet region during the most recent October 2003 RF12 inspection. This limitation was based on the initial data developed partly under CEOG Task 1154 which estimated approximately 4 to 5 inches would satisfy both the pull-out and leakage criteria under postulated accident conditions. Since that time, additional testing was conducted which concluded the initial data was not conservative due to the type of water used to evaluate the leakage. Initially, de-oxygenated de-mineralized water was used in the abandoned Connecticut Yankee tubesheet. These initial results were compared to the most recent test and it was concluded the initial data would be excluded from the dataset.

Westinghouse in WCAP 16208-P, Rev. 0 performed an assessment for determining the inspection depth within the tubesheet (C*). Based on this assessment, Waterford-3 would need to inspect to a depth of approximately 10.4 inches into the expansion region of the tubesheet.

To address the un-inspected portion of the generator, leakage estimates were based on the distribution identified between 8 and 12 inches of the tubesheet. A leakage value was then established and was added to the operational assessment for the full cycle estimate. This additional leakage was added to all other mechanisms and verified to be below the site limit based on postulated accident conditions. It was determined that the total leakage was 0.2774 gpm under main steam line break conditions which is within the site limit of 0.5 gpm per SG.

The impact of cracks potentially in-service in TTS zone between the C* depth (assumed to be -12 inches for this assessment) and the RF12 depth (-8 inches) of inspection is given as follows:

Parameter	Value	Source
Allowed Accident Leakage for Waterford-3 (Cycle 13)	0.5 gpm or 720 gpd	TS 3 / 4.4.4 Bases
Operational Assessment (OA) Based Leakage Determination	0.1 gpm	Waterford ER-W3-2004-0041-000
Accident Leakage below C*	0.1 gpm	WCAP-16208-P, R0
Estimate of Number of Cracks (In Zone)	32	Westinghouse projection to 12" of TS
Leakage per Crack	0.00242 gpm/crack	90 th percentile value
Total Leakage [OA Leakage+ Below C* Leakage + In-Zone Leakage (No. of in-zone cracks X leakage/crack)].	<u>0.2774 gpm</u>	[<0.5 gpm/SG accident assumed leakage]

Attachment 2

W3F1-2004-0091

List of Regulatory Commitments

List of Regulatory Commitments

The following table identifies those actions committed to by Entergy in this document. Any other statements in this submittal are provided for information purposes and are not considered to be regulatory commitments.

COMMITMENT	TYPE (Check one)		SCHEDULED COMPLETION DATE (If Required)
	ONE- TIME ACTION	CONT COMP	
Waterford-3 will increase the depth of inspections starting with the next RF13 refueling outage (spring 2005), but the inspection requirement will be limited to the analyzed safety assessment depth consistent with WCAP-16208-P, Rev. 0.		X	RF13
Entergy is proposing to submit a technical specification change consistent with the EPRI Generic Licensing Change Package (GLCP) as provided by Technical Specification Task Force (TSTF)-449, Revision 2, <i>Steam Generator Tube Integrity</i> . Entergy will submit this change as part of the NRC Consolidated Line Item Improvement Process (CLIIP) or as a Waterford-3 specific amendment request if the CLIIP has not been released by the NRC. The specific limitation for tubesheet depth inspection with the Plus Point probe will be included with the proposed technical specification change.	X		By February 15, 2005